



State of Washington
REPORT OF EXAMINATION
FOR WATER RIGHT APPLICATION

File NR G2-30062
WR Doc ID 2222824

PRIORITY DATE
7/18/2002

WATER RIGHT NUMBER
G2-30062

MAILING ADDRESS
WA DEPARTMENT OF FISH & WILDLIFE
600 CAPITOL WAY N
OLYMPIA WA 98501-9999

SITE ADDRESS (IF DIFFERENT)
DESCHUTES WATERSHED CENTER
(PIONEER PARK)
5800 HENDERSON BOULEVARD
TUMWATER, WA 98501

Quantity Authorized for Withdrawal or Diversion

WITHDRAWAL OR DIVERSION RATE	UNITS	ANNUAL QUANTITY (AF/YR)
1,000	GPM	1,600

Purpose

PURPOSE	WITHDRAWAL OR DIVERSION RATE			ANNUAL QUANTITY (AF/YR)		PERIOD OF USE (mm/dd)
	ADDITIVE	NON-ADDITIVE	UNITS	ADDITIVE	NON-ADDITIVE	
Fish propagation	1,000		GPM	1,600		01/01 - 12/31

Source Location

COUNTY	WATERBODY	TRIBUTARY TO	WATER RESOURCE INVENTORY AREA
Thurston	Groundwater	Puget Sound	13-Deschutes

SOURCE FACILITY/DEVICE	PARCEL	WELL TAG	TWP	RNG	SEC	QQ Q	LATITUDE	LONGITUDE
Well 1	12701220200	AFT344	17N	02W	01	NWNW	46.996261	-122.882875
Well 2								

To be drilled within a quarter mile from Well 1
Datum: NAD83/WGS84

Place of Use (See Attached Map)

PARCELS (NOT LISTED FOR SERVICE AREAS)

12701210201, 12701220200, 12836330000, 12702110100, 12835440100

LEGAL DESCRIPTION OF AUTHORIZED PLACE OF USE

That portion of NW ¼, NW ¼ S1 T17N R2W lying north of the Deschutes River; except the city street known as Henderson Blvd.

AND

That portion of NE ¼ NE ¼ S2 T17N R2W lying north of the Deschutes River

AND

That portion of SW ¼ SW ¼ S36 T18N R2W lying south of the railway right-of-way; except the city street known as Henderson Blvd.

AND

That portion of E¼, SE ¼ SE ¼ S35 T18N R2W lying south of the railway right-of-way.

Proposed Works

Well: 12 inches in diameter and 417 feet deep, screened from 334 to 402 feet below ground surface.

Development Schedule**BEGIN PROJECT**

Started

COMPLETE PROJECT

September 1, 2023

PUT WATER TO FULL USE

September 1, 2024

Measurement of Water Use

How often must water use be measured?

Monthly

How often must water use data be reported to Ecology?

Annually (Jan 31)

What volume should be reported?

Total Annual Volume (ac-ft/yr)

What rate should be reported?

Annual Peak Rate of Withdrawal (gpm)

Provisions**Wells, Well Logs and Well Construction Standards**

All wells constructed in the state shall meet the construction requirements of WAC 173-160 titled "Minimum Standards for the Construction and Maintenance of Wells" and RCW 18.104 titled "Water Well Construction". Any well which is unusable, abandoned, or whose use has been permanently discontinued, or which is in such disrepair that its continued use is impractical or is an environmental, safety or public health hazard shall be decommissioned.

All wells shall be tagged with a Department of Ecology unique well identification number. If you have an existing well and it does not have a tag, please contact the well-drilling coordinator at the regional Department of Ecology office issuing this decision. This tag shall remain attached to the well. If you are required to submit water measuring reports, reference this tag number.

Installation and maintenance of an access port as described in WAC 173-160- 291(3) is required.

Measurements, Monitoring, Metering and Reporting

An approved measuring device shall be installed and maintained for each of the sources identified by this water right in accordance with the rule "Requirements for Measuring and Reporting Water Use",

WAC 173-173.

Recorded water use data shall be submitted via the Internet. To set up an Internet reporting account, contact the Southwest Regional Office. If you do not have Internet access, you can still submit hard copies by contacting the Southwest Regional Office for forms to submit your water use data.

WAC 173-173 describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition the Department of Ecology for modifications to some of the requirements.

Schedule and Inspections

Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the project location, and to inspect at reasonable times, records of water use, wells, diversions, measuring devices and associated distribution systems for compliance with water law.

Water Level Measurements

In order to maintain a sustainable supply of water and ensure that your water source is not impaired by future withdrawals, static water levels should be measured and recorded monthly when the well is not pumping, if possible, using a consistent methodology. Static water level is defined as the water level in a well when no pumping is occurring and the water level has fully recovered from previous pumping.

Static water level data should include the following elements:

- Unique Well ID Number.
- Measurement date and time.
- Measurement method (air line, electric tape, pressure transducer, etc.).
- Measurement accuracy (to nearest foot, tenth of foot, etc.).
- Description of the measuring point (top of casing, sounding tube, etc.).
- Measuring point elevation above or below land surface to the nearest 0.1 foot.
- Land surface elevation at the well head to the nearest foot.
- Static water level below measuring point to the nearest 0.1 foot.

Proof of Appropriation

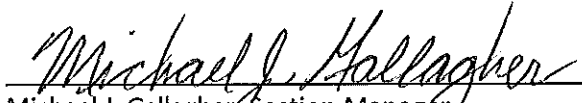
The water right holder shall file the notice of Proof of Appropriation of water (under which the certificate of water right is issued) when the permanent distribution system has been constructed and the quantity of water required by the project has been put to full beneficial use. The certificate will reflect the extent of the project perfected within the limitations of the permit. Elements of a proof inspection may include, as appropriate, the source(s), system instantaneous capacity, beneficial use(s), annual quantity, place of use, and satisfaction of provisions.

Findings of Facts

Upon reviewing the investigator's report, I find all facts, relevant and material to the subject application, have been thoroughly investigated. Furthermore, I concur with the investigator that water is available from the source in question; that there will be no impairment of existing rights; that the purpose(s) of use are beneficial; and that there will be no detriment to the public interest.

Therefore, I ORDER approval of Application No. G2-30062 subject to existing rights and the provisions specified above.

Signed at Olympia, Washington, this 8th day of April 2015.


Michael J. Gallagher, Section Manager

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearing Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.
- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Mailing Addresses	Street Addresses
Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903	Pollution Control Hearings Board 1111 Israel RD SW Ste 301 Tumwater, WA 98501
Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608	Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503

Please send a copy of your appeal to:

Michael J. Gallagher, Section Manager
Water Resources Program
Southwest Regional Office
P.O. Box 47775
Olympia WA 98504-7775

For additional information visit the Environmental Hearings Office Website: <http://www.eho.wa.gov>. To find laws and agency rules visit the Washington State Legislature Website: <http://www1.leg.wa.gov/CodeReviser>.

INVESTIGATOR'S REPORT

Application for Water Right Washington Department of Fish & Wildlife
Water Right Control Number G2-30062
Tammy Hall, Department of Ecology

BACKGROUND

Priority Processing

This application is being priority processed because it is part of a project that qualifies under WAC 173-152-050 (2)(c). Groundwater pumped will be discharged to the Deschutes River without diminishment of volume such that there is a net increase in surface water volume. Streamflows upstream of the point of diversion may be reduced on the order of 1.6 cfs. However, streamflows downstream of the point of diversion will be increased by up to 2.2 cfs. Significant environmental benefits will also be realized by:

- Increased streamflows downstream of the hatchery
- Elimination of fishery net pens in Percival Cove of Capital Lake that are contributing to water quality degradation
- Discharging cooler clean groundwater to the Deschutes River will improve degraded water quality parameters (fecal coliform bacteria, temperature, dissolved oxygen (DO), pH, or fine sediment) listed under Section 303(d) of the Clean Water Act
- Raising and releasing approximately 3.5 million salmonids annually

These significant environmental benefits are considered sufficient to over-mitigate the upstream impacts of reduced streamflow that may be caused by the groundwater withdrawal.

Description and Purpose of Proposed Application

On July 18, 2002, Richard Eltrich, representing Washington Department of Fish and Wildlife (WDFW) filed Water Right Application G2-30062 to divert 3,000 gallons per minute (gpm) and 3,450 acre-feet (ac-ft) per year from four wells for fish propagation. This request was revised to 1,000 gpm and 1,600 ac-ft per year from two wells. The attributes of this application are summarized in Table 1. The proposed points of withdrawal are summarized in Table 2.

Table 1 Application Summary

Attributes	Summary
Name	Washington Department of Fish & Wildlife
Priority Date	7/18/2002
Instantaneous Quantity	1,000 gpm
Annual Quantity	1,600 ac-ft/yr
Purpose of Use	Fish propagation
Period of Use	Year-round as needed
Place of Use	That portion of NW ¼, NW ¼ S1 T17N R2W lying north of the Deschutes River; except the city street known as Henderson Blvd. AND That portion of NE ¼ NE ¼ S2 T17N R2W lying north of the Deschutes River AND That portion of SW ¼ SW ¼ S36 T18N R2W lying south of the railway right-of-way; except the city street known as Henderson Blvd. AND That portion of E¼ SE ¼ SE ¼ S35 T18N R2W lying south of the railway right-of-way.

Table 2 Proposed Sources of Withdrawal.

Source Name	Parcel	Well Tag	Tw	Rng	Sec	QQ Q	Latitude	Longitude
Well 1	12701220200	AFT344	17N	02W	1	NW NW	46.996261	-122.882875
Well 2	To be drilled within a quarter mile from Well 1							

Legal Requirements for Approval of Appropriation of Water

In accordance with RCW 90.03.290, in order for Ecology to approve a water right application, each element of this four-part test must be satisfied:

- Water must be available.
- There must be no impairment of existing rights.
- The water use must be beneficial.
- The water use must not be detrimental to the public interest.

Laws governing the water right permitting process are discussed in RCW 90.03.250 through 90.03.340 and RCW 90.44.050.

Public Notice

RCW 90.03.280 requires public notice of a proposed withdrawal in an area newspaper of general circulation. The notice must be published once a week, for two consecutive weeks. Notice of G2-30062 and S2-30063 was published in *The Olympian* on January 22 and 29, 2003. No comments or protests were received.

During the first posting of the draft report of examination and associated investigator's report in 2012, comments were received from the city of Tumwater (City) and the Squaxin Island Indian Tribe. Both commented on the lack of acknowledgement of impacts from groundwater withdrawals on stream flows in the Deschutes River upstream from the point of discharge from the hatchery to the Deschutes River. The revised investigator's report acknowledges these impacts and determines that the environmental benefits are significantly greater than the upstream impacts, as a result of the following, as described and expanded upon elsewhere in the investigator's report:

- Increased downstream flows,
- Improved water quality in the Deschutes River (which is listed under Section 303(d) of the federal Clean Water Act) from the discharge of groundwater to the river,
- Removal of net pens in Percival Cove as a result of relocating operations to the new hatchery
- The annual release of approximately 3.5 million salmonids from the hatchery
- Reduced risks of introduced fish pathogens into the Deschutes watershed

The City additionally commented on the understanding between WDFW and the City to co-process water right applications for the hatchery (i.e., G2-30062 and S2-30063) and for municipal water supply (i.e., G2-29888) as an integrated approach to water resources management in the Deschutes Watershed. Ecology has not received any information on this proposal to consider in the processing of this application.

Consultation with Tribes

The Squaxin Island Indian Tribe provided comment on the draft report of examination requesting acknowledgement of impacts from groundwater withdrawals on flows upstream of the point of withdrawal. Upon further consideration of the available information, the Tribe agrees that the net environmental benefits of upstream impacts and the downstream benefits, including those of stream flow, water quality and salmonid production are positive and justify issuance of this water right (e-mail correspondence from Jeff Dickison to Larry Peck on March 24, 2015).

Consultation with the Department of Fish and Wildlife

The Department must give notice to the Department of Fish and Wildlife of applications to divert, withdraw or store water (RCW 77.57.020). Steve Boessow of the Washington Department of Fish and Wildlife (WDFW) provided a letter to Ecology on August 22, 2002 stating that the Habitat Program has no objections to this application. The habitat section of WDFW has assessed the impacts of this project and considers the positive benefits resulting in increased downstream flows, water quality and salmonid productivity to be significantly greater than is needed to offset the negative impacts of decreased flow upstream of the hatchery.

Consultation with the Department of Ecology Water Quality Program

Ecology's Water Quality Program supports this project (Ecology 2003).

State Environmental Policy Act (SEPA)

A SEPA determination evaluates if a proposed withdrawal may cause significant adverse environmental impacts. A SEPA threshold determination is required for the following conditions:

- Surface water applications for more than one cubic feet per second (cfs). For agricultural irrigation, the threshold increases to 50 cfs, if the project isn't receiving public subsidies.
- Groundwater applications requesting more than 2,250 gpm.
- Projects with several water right applications where the combined withdrawals meet the conditions listed above.
- Projects subject to SEPA for other reasons (e.g., the need to obtain other permits that are not exempt from SEPA).
- Applications that are part of several exempt actions that collectively trigger SEPA under WAC 197-11-305.

A SEPA environmental checklist was prepared to cover the complete hatchery project, including the water right applications that consist of a surface water right for 21 cfs and a groundwater right for 1,000 gpm.

Ecology has reviewed the Mitigated Determination of Nonsignificance issued November 15, 2004 for the Deschutes Watershed Center by Washington Department of Fish and Wildlife, the SEPA lead agency.

INVESTIGATION

This Report of Examination (ROE) serves as the written findings of fact concerning all things investigated regarding Water Right Application No. G2-30062.

The following information was used to evaluate this application:

- State Ground and Surface Water Codes, administrative rules, and policies.
- Water right certificates, permits, claims, and applications on record with the Department of Ecology.
- Water well reports recorded in the Department of Ecology's Well Log Image System.
- Topographic and local area maps.
- Materials submitted by the Applicant in support of the application (Golder, 2007).
- Groundwater modeling results presented in Golder (2007 and 2008)
- Information from Preliminary Permit investigation.
- Technical Memorandum dated April 24, 2012 by Tammy Hall, Licensed Hydrogeologist, with Ecology's Water Resources Program at the Southwest Regional Office.
- Notes from a site visit on April 26, 2012 conducted by Tammy Hall (Ecology).

Project Location

The Deschutes Watershed Center (DWC) at Pioneer Park is on the north side of the Deschutes River, downstream of the Henderson Boulevard Bridge in the City of Tumwater roughly at River Mile (RM) 2.5. The site is about 44 acres; however, the hatchery facility will occupy only about 8.5 acres.

See Attachments #1 and #2

The hatchery will function to incubate eggs and complete early rearing through release of fall Chinook and steelhead. The facility will also provide juveniles for final rearing and release at the Tumwater Falls Park facility. Approximately 3,000,000 sub-yearlings fall Chinook, 200,000 yearling fall Chinook salmon, and 25,000 steelhead trout will be directly released from the Pioneer Park facility into the Deschutes River. The hatchery will use both surface water and groundwater. The surface water portion of this facility is addressed in Water Right Application No. S2-30063.

Proposed Use, System Description, and Water Demand

The proposed use is fish propagation.

Collected fish eggs will be incubated on groundwater to avoid pathogens then reared in ponds and raceways filled with a combination of ground and surface water. The amount of water needed will vary throughout the year based on the life requirements of the fish being raised.

Groundwater will be pumped from two wells, each having a submersible pump, suitable for variable speed operation of up to 1,000 gpm. DWC test well drilled under the Preliminary Permit will serve as one well. A second well will be drilled to allow system redundancy. The location of the second well has not yet been determined, but will be within a quarter mile from Well 1.

Both wells will be metered for flow from the wellhead. During normal operations, only one well will be pumped at a time and the second well will be used as backup. (Fishpro, 2007)

Water from both wells will share a common supply mainline with surface water diverted under S2-30063. An aeration column will stabilize dissolved gasses and increase oxygen levels in the water. Treated water will collect in a headtank before circulating through the hatchery.

The hatchery will consist of the following:

- Hatchery building (where eggs are incubated and hatched).
- One 20 feet by 145 feet raceway.
- Three 20 feet by 145 feet raceways.
- Three 10 feet by 100 feet raceways.
- One community pond.

Meters will measure water use in the hatchery building. A slotted distribution system will disburse water for the raceways. A butterfly valve will be used to manually control flow.

Overflow drains from the raceways and the hatchery building will collect water after use and circulate it through a treatment system. Treated water will be filtered and discharged via gravity flow back to the Deschutes River about 30 feet downstream from the surface water intake.

Because there will be no heavy feeding in the community pond, overflow water will not require treatment before being discharged back into the surface water system. Overflow will be pumped to either a wetland or back to the main overflow discharge point near the surface water intake. Less than 5% of the water pumped into the community pond will be dispersed to the wetland system. Water flowing through the wetland will return to the river by way of subsurface flow. (Fishpro, 2007)

Preliminary Permit

Ecology issued a Preliminary Permit on May 19, 2009 to allow drilling and testing of a test well (Deschutes Watershed Center test well, DWC) at the proposed Pioneer Park hatchery. The objectives of the testing were to determine the following:

- Distance and time drawdown in the producing aquifer.
- Aquifer transmissivity.
- Aquifer storage coefficient and specific yield.
- Aquitard leakage.
- Effects on surface water.
- Effects to area users.
- Potential to increase risk of seawater intrusion in the area.

Hydrologic/Hydrogeologic Evaluation

Geologic Setting

Pioneer Park is in the Deschutes River watershed, situated near the southern end of the Puget Sound lowland. The Puget Sound lowland was created when the North American continental plate converged with a denser oceanic plate of the eastern Pacific Ocean. Subsidence and volcanism allowed thick deposits to accumulate in the basin, which were changed later by folding and faulting. These deposits are the bedrock units that underlie the Deschutes watershed and form the surrounding foothills (Snively and others, 1958; Noble and Wallace, 1966).

Continental glaciers, advancing south into the Puget Sound lowland from coastal British Columbia covered portions of the Deschutes watershed at least twice during the Pleistocene Epoch. The most recent glacial advance occurred about 15,000 years ago. As the glaciers receded about 13,500 years ago, meltwater streams left behind thick deposits of gravel and sand. These meltwater streams cut a complex network of channels, redistributing much of this material and creating features that define the present topography of the central and northern watershed (Sinclair and Bilhimer, 2007).

Deschutes River Hydrology

The Deschutes River originates within the steep, heavily forested Bald Hills. The river flows generally northwest for about 60 miles, before it discharges to Capitol Lake near the city of Tumwater. Elevations in the watershed range from a few feet above sea level near Capitol Lake to 3,870 feet at Cougar Mountain in the Bald Hills (Sinclair and Bilhimer, 2007).

Seepage runs in 1988 of the lower 24.9 miles of the Deschutes River showed an average gain of 2.16 cfs per mile indicating groundwater discharge sustains summer baseflows in the Deschutes. Additionally, groundwater level measurements made during a canvassing of nearly 800 area wells during the summer of 1988 also support this relationship. Groundwater generally moves from upland recharge areas in the interior of Thurston County toward natural points of discharge along the Puget Sound shoreline and the lower Deschutes River (Drost, 1999; Sinclair and Bilhimer, 2007).

At the DWC at Pioneer Park, the Deschutes River is a gaining stream that receives baseflow from groundwater discharge.

Site Geology

The Deschutes Valley Aquifer (DVA) occupies the lower Deschutes River Valley from the confluence with Spurgeon Creek at River Mile 9.3 to Tumwater Falls, downstream from the DWC at Pioneer Park. This aquifer is up to 500 feet deep and parallels the river. Generally, the DVA has the following characteristics:

- The DVA appears to broaden and deepen to the north.
- The sediments consist of a fining-upward sequence, including a lower coarser, cleaner sand, DVA(c), overlain by a finer, dirtier (silty) sand DVA(f).
- The surface layer locally appears to be a cleaner sand that becomes thicker to the north. This has been interpreted to be the finer (dirtier) sand which has had the finer fractions winnowed out by fluvial re-working of the Deschutes River.

DWC Test Well Installation

The cleaner, coarser DVA (c) was the target aquifer for the wells at the DWC wells at the Pioneer Park (Golder, 2011). DWC test well (Well 1) was drilled during the summer of 2009 in accordance with the Preliminary Permit issued on May 19, 2009. Construction details are summarized in Table 3.

Table 3. Well 1 construction details.

Drilling start date	June 10, 2009
Drilling end date	November 2009
Drilling method(s)	Cable tool to 340 ft below ground surface (bgs) Dual rotary reverse from 340 to 417 ft bgs
Surface elevation (ft above mean sea level, msl)	117.7
Well diameter (inches, in)	16" – 3.2 feet above ground surface (ags) ft to 217 ft bgs 12" – 1 foot ags to 340 ft bgs 6" – 310.5 ft- 412 ft bgs
Completed depth (ft bgs)	417
Screened interval (ft bgs)	345.5-402 ft bgs
Screen size	0.040-inch v-wire wrapped screen
Static water level (ft ags)	8.54
Date measured	October 20, 2009
Pumping capacity (gpm)	1,280
Source (Geologic unit)	DVA(c)

Pumping Test

An initial step-rate pumping test conducted on October 19, 2009 evaluated well production, determined well efficiency, and selected a pumping rate for the constant rate test.

The step test consisted of pumping the well over four steps of increasing pumping rates from 500 to 1,280 gpm. The first three steps were each 45 minutes long and the last step lasted 30 minutes. Data collected during the step test showed that as pumping rate increased, specific capacity decreased. Well efficiency also decreased with increased pumping rate. When pumping 1,000 gpm, well efficiency was 80 %, whereas at 1,280 gpm, efficiency reduced to 75% (Golder, 2011).

The constant rate pump test began on October 20 and ended October 23, 2009. Seven wells were used to monitor water level changes during the test. Data collected show that at 245 ft away, observed drawdown was only 1.5 feet. At 1,700 feet away, there was no measurable drawdown. The following was also confirmed (Golder, 2011):

- No aquitard leakage or significant boundary conditions were identified.
- No effects to surface water were observed or anticipated
- No significant impacts to area users are expected
- No potential to increase seawater intrusion because static water levels in the DVA are above land surface (artesian conditions) and DWC test well is more than three miles from marine water. Large capacity wells have historically operated for extended periods at the former Briggs Nursery and Brewery with no resulting known saline intrusion effects.

Aquifer test results determined during the pump tests are summarized in Table 4.

Table 4. Aquifer test results.

Parameter	Value
Pumping rate	1,200 gpm
Aquifer storativity	0.005*
Aquifer transmissivity	
Using pumping data	8,300 ft ² /day*
Using recovery data	7,049 ft ² /day*
Static water level at beginning of test	8.2 ft above ground surface
Total drawdown	58 ft
Minutes after pumping began	4,322 (3 days)
Radius of influence	3,400 ft

*(Cooper-Jacob, 1946)

Golder, 2011

Water Quality

Water quality analysis conducted on a sample collected at the end of the pumping test exhibited reducing conditions, slightly elevated total dissolved solids (TDS; 434 mg/L), and moderate hardness (160 mg/L as CaCO₃). The reducing conditions were reflected by the presence of dissolved iron (0.31

mg/L), manganese (0.33 mg/L), ammonia (1.09 mg/L), and a strong rotten egg smell indicative of hydrogen sulfide. The slightly elevated TDS was accompanied by a slightly elevated electrical conductivity (642 $\mu\text{S}/\text{cm}$ TDS) and sodium (i.e., 38 mg/L; the State Advisory Level for drinking water is 20 mg/L, though this standard is applicable only if the water is used for drinking). The ambient groundwater temperature is stable at approximately 12 degrees Celsius, and turbidity was approximately 1 NTU. Other beneficial attributes of groundwater use in a hatchery are that it is pathogen-free, cool and clear.

After withdrawal from the ground, the water will be treated by aeration to oxygenate the water, precipitate iron and manganese, and remove hydrogen sulfide before it is delivered for use in the hatchery. Aeration will also raise the pH of the water by removing carbonic acid (i.e., CO_2) thereby also enhancing the removal ammonia. After treatment and passage through the hatchery, the water is expected to be of better quality than is currently in the Deschutes River to which it is discharged.

The Deschutes River is listed as water quality impaired under Section 303 (d) of the federal Clean Water Act with respect to temperature, fecal coliform bacteria, dissolved oxygen and pH. Groundwater withdrawn from the ground and is then passed through the hatchery and subsequently discharged to the Deschutes River will result in improved water quality in the Deschutes River.

Groundwater Modeling

Golder developed a preliminary three-dimensional steady-state groundwater flow model of the Lower Deschutes Valley to evaluate potential effects a groundwater withdrawal at the DWC site would have on the Deschutes River and groundwater users (Golder, 2007 and 2008). The model uses the USGS code MODFLOW-2000 (Harbaugh and others, 2000) to simulate groundwater flow and interchange with the Deschutes River. This model was intended to look only at potential effects of a withdrawal at the DWC Pioneer Park site, and as such, is not calibrated. It excludes all existing pumping wells so it is not appropriate to use this model for other sites (Golder, 2007).

The results of the modeling show a simulated well fully penetrating the lower portion of the DVA, with a pumping rate of up to 1,000 gpm (2.2 cfs) is predicted to cause a maximum baseflow reduction in the Deschutes River immediately upstream of the point of diversion of about 0.7 cfs. The approximately 0.7 cfs reduction in upstream flows that is captured by groundwater pumping is subsequently discharged to the Deschutes River, essentially creating a bypass reach, along with an additional 1.5 cfs for a total of approximately 2.2 cfs. The additional 1.5 cfs that is captured by pumping is intercepted groundwater that would otherwise discharge to Puget Sound, and results in a net increase of streamflow at and downstream of Pioneer Park.

This simulation also showed drawdown in the production zone of the DVA would be about one foot at a radius of approximately a quarter mile and less than $\frac{1}{2}$ foot at a radius of one mile (Golder, 2007). Pumping test data corroborate these predicted impacts, showing no measurable drawdown at a distance of 1,700 feet. (Golder, 2011)

Other Rights Appurtenant to the Place of Use

Presently, there are no other water rights issued for this project. However, at the same time WDFW filed this application, they also filed Surface Water Application No. S2-30063. Both applications (S2-30063 and G2-30062) are considered one project and are being processed concurrently.

Application S2-30063 requests to divert 21 cfs and 6,900 ac-ft for non-consumptive use from the Deschutes River for fish propagation. Water from both G2-30062 and S2-30063 will be treated and discharged to the Deschutes River at the same location after use.

Impairment Considerations

Effects on the Deschutes River

The Water Resources Management Program for the Deschutes River Basin, WRIA 13, was adopted in 1988. Chapter 173-513 WAC establishes instream flows for the Deschutes River from November 1 through April 14 and closes the river to new further consumptive appropriations of surface water from April 15 to October 31 each year. Future groundwater withdrawals are not affected unless the withdrawal would clearly have an adverse impact on the surface water system, "contrary to the objectives of this chapter." (WAC 173-513-050). "The purpose of this chapter is to retain perennial rivers, streams, and lakes in the Deschutes River basin with instream flows and levels necessary to provide protection for wildlife, fish, scenic, aesthetic, environmental values, recreation, navigation, and water quality." (WAC 173-513-020).

Instream flows for the lower Deschutes River are set at RM 3.4 (USGS Gage 12080000) and summarized in Table 5. The U S Geological Survey is no longer operating this station.

Table 5. Instream flows for the Deschutes River at RM 3.4, USGS Gage 12080000.

<i>Month</i>	<i>Flow rate (cfs)</i>	<i>Month</i>	<i>Flow rate (cfs)</i>
December15- March 31	400	November 1-14	150
April 1-14	350	November 15-31	200
April 15-October 31	Closed	December 1-14	300

The U.S. Geological Survey (USGS) maintains streamflow gaging stations at two locations along the Deschutes River: one at river mile (RM) 2.4 (station 12080010, Deschutes River at E Street in Tumwater), and one at RM 24.9 (station 12079000, Deschutes River near Rainier).

Flow data collected at 12080010 from 1945 until 2010 show flows are highest from December through April and lowest in August and September. High demand months for this project correspond to months where flows in the Deschutes River are highest. Comparing flows from this station at RM 2.4 to flows set in Chapter 117-513 WAC at RM 3.4, instream flows are almost always exceeded. The predicted average change in stream flow at this station as a result of exercising the requested groundwater withdrawal is predicted to be an increase of approximately 0.6 cfs.

Groundwater modeling predicts roughly one-third of the water pumped will be captured from streamflow in the Deschutes River. Because water pumped will be returned to the river after being used, streamflow in the Deschutes River will increase from the point of discharge at the hatchery to the mouth of the river. This will particularly benefit the river during the summer, when regulated instream flows are not always met. The water being discharged during the summer will be colder than ambient water temperature and undergo treatment for several water quality parameters so water being discharge will be of a higher quality than what is currently there (Fishpro, 2007). The purpose of the hatchery is to raise and release approximately 3.5 million salmonids annually to meet treaty tribal obligations, recreational and commercial fishery benefits

Impacts from groundwater withdrawal on the river will be over-mitigated from the point of discharge at the hatchery to the mouth of the river. Impacts upstream of the point of discharge may not be mitigated. However, the net benefit of raising and releasing 3.5 million salmonids annually will be significant by the protection and enhancement of wildlife and fish, and improved treaty and nontreaty fishing opportunities. Furthermore, discharge of groundwater will improve water quality and quantity in the river.

Effects to Area Groundwater Users

Area groundwater users should not be impaired by withdrawals from the DWC well. A well 245 feet away had a drawdown of only 1.5 feet during the pump test. A well 1,700 feet away had no measurable drawdown. Groundwater modeling and predictions from data gathered during the pump test estimate the radius of influence of pumping of 3,400 feet or roughly 0.6 mile.

Golder (2007) evaluated the potential to impair area users and predicted drawdown within seasonal variations and reasonable pumping lift for a well. Golder predicted the following hypothetical effects:

- Estimated drawdown in wells completed in the shallow aquifer may be about ½ foot at about a ½-mile from the DWC test well.
- Wells completed in the DVA, the same aquifer as the DWC test well, may be about a one foot drawdown due to pumping at a distance of ¼ mile.

Ecology's Water Rights Tracking (WRTS) database was queried to identify water right certificates within the radius of influence of pumping. Both certificates are outside the area where measureable drawdown was detected in the pump test and tap aquifers above the DVA. The attributes of these certificates are summarized in Table 6.

Table 6. Water Right Certificates in the radius of influence of pumping DWC test well (3,400 feet).

<i>Certificate No.</i>	<i>Name</i>	<i>Purpose of use</i>	<i>gpm</i>	<i>ac-ft/yr</i>	<i>Distance from DWC Test Well (ft)</i>
G2-20338CWRIS	James D. Lance	Irrigation, Domestic supply	25	5	2,400
G2-28072	Phillip and Therese Hulbert	Irrigation	50	0.5	2,700

Ecology's databases also report the following information in a radius of about 1 ¼ miles:

- Ninety water claims are recorded. Nearly all are for domestic supply from wells.
- One-hundred-seven water wells are listed in Ecology's well log data base. Golder (2007) identified the nearest well is about ¼ mile away.

Water Availability

Water is available for this proposed appropriation. WDFW requested 1,000 gpm and 1,600 ac-ft per year. DWC test well produces the requested amount.

Senior water rights and surface water will not be impaired by this proposed appropriation. Water pumped from the DWC well will be returned to the Deschutes River after being used and treated. Flows

and water quality in the river will be enhanced from the point of discharge at the hatchery to the mouth of the river.

Beneficial Use

The use of water for fish propagation is defined in statute as a beneficial use (RCW 90.54.020(1)).

Public Interest Considerations

Approving this application is not contrary to the public interest.

Maintaining viable salmonid populations is a treaty obligation of the State of Washington to the tribes. Cultural, economic, recreational, and significant environmental benefits will result from the issuance of this surface water permit. Salmonids incubated, hatched and reared at the facility, will be released to the Deschutes River to enhance fisheries throughout the Puget Sound Basin and within the watershed. Fish produced by this program will be harvested in recreational, commercial, and tribal fisheries. These fisheries contribute over \$500,000 annually to the state economy. (Fishpro, 2007). Additional wildlife viewing opportunities will also be enhanced in the lower Deschutes River Basin as returning adult salmonids will be visible to the public.

Construction and operation of the Deschutes Watershed Center hatchery will allow decommissioning net pens in Percival Cove in Capitol Lake that are contributing to water quality degradation. Ecology's Water Quality Program supports the construction of a properly designed hatchery on the Deschutes River (Ecology, 2003).

RECOMMENDATIONS

Based on the results of my investigation, I recommend that this request for a water right be approved, subject to the provisions listed above.

Purpose of Use and Authorized Quantities

The amount of water recommended is a maximum limit. The water user may only use water within the specified limit that is reasonable and beneficial:

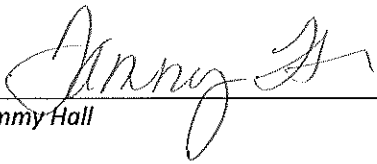
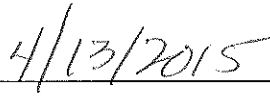
- 1,000 gpm from two wells.
- 1,600 ac-ft per year.
- Fish propagation.

Point of Withdrawal:

- Well 1: NW¼, NW¼, Section 1, Township 17 North, Range 2 W.W.M.
- Well 2: to be drilled within a quarter mile from Well 1.

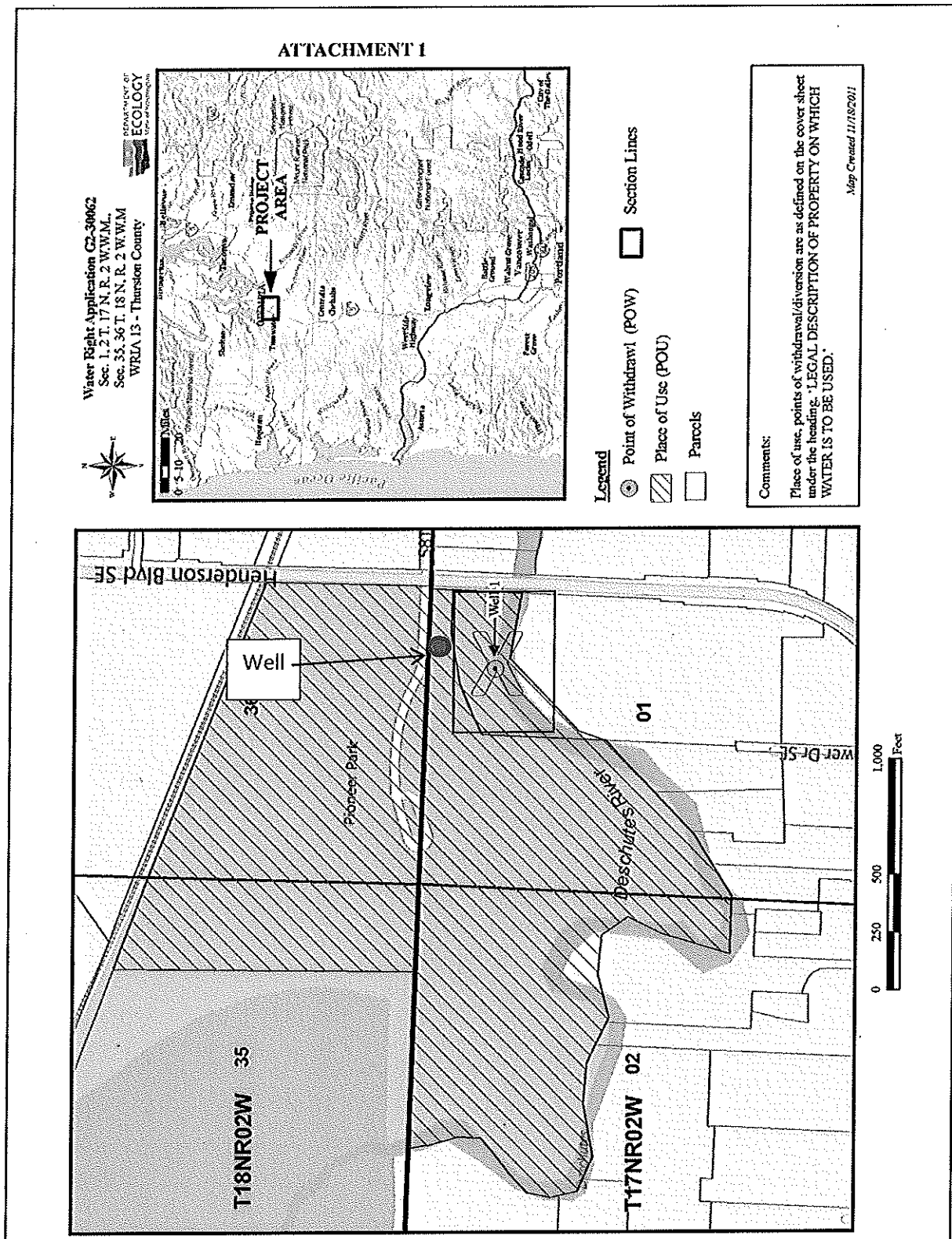
Place of Use:

- As described on Page 1 of this Report of Examination.

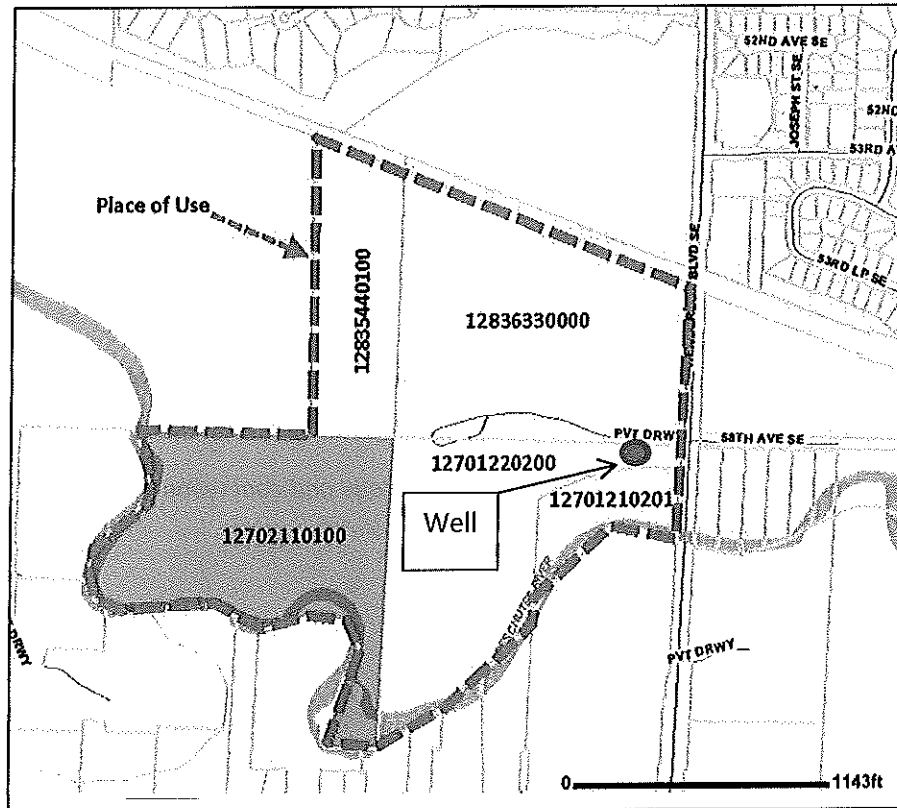
 

Tammy Hall Date

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Attachment 2: Tax parcels for points of diversion and place of use.



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